



# Wanderers

## SOS Talking Points The Solar System

### INTRODUCTION

- The word “planet” is derived from the Greek asteres planetai (wandering stars) or planetai (wanderers)
- The Solar System is held together by Sun’s gravitational pull
- The Sun is much larger than all of the planets in the solar system
- The planets are fairly far apart. For example: Sunlight takes 8 minutes to reach Earth and nearly a day to reach the farthest planets

### TERRESTRIAL PLANETS

#### Mercury

- Mercury is the closest planet to Sun
- It is the smallest of the terrestrial planets
- Mercury has a fast orbit—its year takes only 88 Earth days to travel around the Sun
- It has almost no atmosphere
- Its landscape is dotted with surface craters caused by continual meteoroid bombardment
- Mercury’s surface temperature can vary between 800°F (427°C) in the daytime and -300°F (-184°C) at nighttime due to its extremely slow rotation, proximity to Sun, and minimal atmosphere

#### Venus

- Venus, as seen from Earth, is the brightest object in sky after the Sun and Moon
- Russian probes were the first to land on Venus in the 1970’s and 1980’s
- Venus’s surface is volcanic
- Its atmosphere is composed of thick, dense carbon dioxide with sulfuric acid clouds. Both are potent greenhouse gases that trap incoming sunlight
- At 870°F (465°C), Venus’s surface temperature is hotter than Mercury because of its dense atmosphere
- In comparison, Venus rotates slowly—one Venusian day lasts almost four Earth months

#### Earth

- Earth is the only planet with life as we know it
- Why? The atmosphere and temperatures are “just right” for life
- It is the only known body in our solar system where water can exist as a gas, liquid, and solid
- Vast oceans dominate surface of the planet
- Seasonal changes occur on the surface
- Earth has a solid surface that constantly shifts due to plate tectonics

#### Mars

- Once geologically active, Mars has the largest dormant volcano in the solar system, Olympus Mons
- It also has the longest valley in the solar system, called Valles Marineris
- Mars has a thin, atmosphere primarily composed of carbon dioxide
- Surface conditions are dynamic. Mars has seasons as well as massive dust storms that cover the planet
- Its surface features include the smooth, low-lying northern hemisphere and the craggy, heavily-cratered southern uplands
- Evidence suggests that Mars had water running on its surface at some time in the past

### ASTEROID BELT

- The asteroid belt is composed of small rocky pieces
- The big question is “What happened here?” and “Why no planets?”
- The asteroid Ceres is large enough to be classified as a dwarf planet



## GAS GIANTS

### Jupiter

- Jupiter is the largest and most massive planet in the Solar System
- It rotates rapidly, completing one rotation every 10 hours
- Long-lasting, high-speed winds and storms dominate Jupiter's atmosphere
- Jupiter has a faint planetary ring system and over 63 moons
- The largest moons, discovered by Galileo in 1610, vary widely
  - **Io** is volcanically active
  - **Europa's** cracked surface likely hides an ocean below
  - **Ganymede** is the largest moon in the Solar System
  - **Callisto** is heavily cratered

### Saturn

- Saturn's seemingly serene atmosphere hides powerful storms and winds on its surface
- Saturn is known for its extensive ring system made of chunks of ice, rock, and dust with small moonlets embedded within the rings
- Saturn has more than 60 moons. Conditions vary among the moons
  - **Titan**, the largest moon, has a thick, smoggy, atmosphere covering its icy surface with lakes of liquid methane or ethane
  - Small **Enceladus** has water and ice geysers at its south pole. Its water vapor coat other nearby moons and create a thin Saturn ring

## ICE GIANTS

### Uranus

- Uranus receives 400 times less sunlight than Earth
- Uranus lies nearly sideways, making its axis nearly parallel to the plane of the Solar System.
- This extreme tilt give rise to seasons that last nearly 28 Earth years
- Uranus as many moons and a faint ring system
- It has only been visited by one spacecraft, Voyager 2, in 1986
- Like the other giant planets, Uranus's atmosphere is primarily hydrogen and helium with a trace of methane gas over deep clouds, giving it a pale blue-green tint.

### Neptune

- Neptune also has many moons and a faint ring system
- Its Great Dark Spot, a large storm with extremely strong winds, disappeared in the 1990s
- Neptune's vivid blue color is due to its frigid temperature: -371°F (-224 °C)
- Its icy atmosphere occasionally has high clouds of methane ice
- Neptune was visited by Voyager 2 in 1989

## KUIPER BELT

- The Kuiper Belt is region beyond the main planets with many dark and icy objects such as comets
- It is home to many dwarf planets, like Eris and Pluto
- Pluto may have an atmosphere that freezes to the surface during winter, and has at least 4 moons

## SUMMARY

- Far beyond the Kuiper Belt is the Oort Cloud, a vast region that encloses the entire Solar System
- The Oort Cloud is the realm of many long-period comets, bound by the Sun's gravity but with orbits of several hundreds to several thousands of years
- Our Solar System is not unique. The Milky Way galaxy has many stars with planetary systems with many exotic, new planets

For more information please visit:

<http://solarsystem.nasa.gov/planets>

<http://science.gsfc.nasa.gov/690/solarsystemtour.html>